

REMARKS

1. In response to the Office Action mailed March 28, 2002, Applicants respectfully request reconsideration. The Office Action Summary sheet indicates that the Office Action is responsive to the communication filed February 15, 2002. A Preliminary Amendment was filed March 5, 2002. A copy of the Preliminary Amendment along with the associated transmittal sheet is enclosed. Although the Preliminary Amendment has not yet been considered by the Examiner, it included only minor amendments to the elected independent claim 36, and has a limited effect on the applicability or substance of the Office Action. Accordingly, the following Remarks address the rejections set forth in the Office Action with occasional reference to the Preliminary Amendment.
2. Claims 36, 38, 39, 41, 42, 44, 46-48, 50 and 53-70 were last presented for examination in this application. In the Office Action, all prior-pending claims (1-52) were rejected. By the foregoing Amendments, claims 36 and 50 have been amended and claim 71 has been added. Thus, with entry of the Preliminary Amendment and this paper claims 36, 38, 39, 41, 42, 44, 46-48, 50 and 53-71 are pending in the captioned application. These Amendments are believed not to introduce new matter and their entry is respectfully requested.
3. Based on the above Amendments and following Remarks, Applicants respectfully request that all outstanding objections and rejections be reconsidered, and that they be withdrawn.

Claim Objections and Rejections Under 35 U.S.C. §112, second paragraph

4. Claim 37 was objected to for failing to further limit the invention recited in claim 36. Claim 37 was canceled in the noted Preliminary Amendment.
5. Claim 36 was rejected under the second paragraph of 35 USC §112 as being confusing for having two recitations of a printed circuit board. Applicants traverse this rejection. Claim 36 recites a printed circuit board that comprises a printed wiring board with components mounted thereon. As in the specification, then, claim 36 recites a printed circuit board comprising a printed wiring board with components mounted thereon. Because there is a single reference to a printed circuit board Applicants

respectfully assert that claim 36 satisfies the requirements of 35 USC §112. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejections Under 35 U.S.C. §102

6. The Examiner rejected claims 36-39 under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 5,394,304 to Jones (hereinafter "Jones"). Based on the above Amendments and the following Remarks, Applicants respectfully request that the Examiner reconsider and withdraw these rejections.

7. Jones is directed to a multilayered thermoplastic self-molding "shrink wrap" package for shielding printed circuit board inserted therein. (*See*, col. 1, lns. 34-36; Fig. 2.) The Jones thermoplastic self-molding package is comprised of a pair of bags 22, 24 having an electrically conductive metallic layer 26 located between the two bags. (*See*, col. 2, lns. 16-27; Fig. 4.) The bags 22, 24 form an enclosure 34 into which a prescribed amount of injectible thermoset resin 38 is injected after insertion of the printed circuit board. An air bleed sprue 36 provides an exhaust path for air to exit enclosure 34 while resin 38 is being injected into the enclosure and while the enclosure is heated and shrinks around the circuit board. (*See*, col. 2, lns. 27-35.) Resin 38 is injected through device 40 which has a nozzle 42 adapted to be inserted into the enclosure 34.

8. As the wrapping is exposed to heat and shrinks, it will bridge the high points of the assembly's components. (*See*, col. 1, lns. 44-46.) Figures 3 and 5 are cross-sectional views of a printed circuit board 10 with the self-molding package sealed thereon. The combined bags 22,24 with the interposed metallic layer 26 extend across the top surfaces of the components 16, 20 to form a tent-like structure supported by the tallest components. As shown in Figure 5, resin 38 fills the cavity or region between component surfaces and the suspended shrink-wrapped package in the self-molding package.

9. In paragraph 1, the Examiner states that Jones discloses an electrically continuous conformal coating for providing an EMI-impervious shield ... including a conductive coating ... conformingly and adheringly coating the surface of one or regions of the printed circuit board ...and a dielectric coating interposed between said conductive coating and predetermined portions of each ... printed circuit board region" (*See*, Office Action, page 3, paragraph 1.)

10. Applicants respectfully disagree. In contrast to Applicants' claimed invention, the self-molding package of Jones does not conformingly coat the printed circuit board. There are portions of the self-molding package (that is, the dielectric and conductive layers) that do not conform to the surface of the printed circuit board (that is, the printed wiring board and the components mounted thereon). For example, in the embodiment illustrated in Figure 5 of Jones, the shrink wrap package does not conform with the side and bottom surfaces of components 16, 18 and 20, as well as the surfaces of the printed wiring board 10 between those same components. Referring again to Figure 5, it appears that the shrink wrap package cannot fit into the regions between, for example, the bottom surfaces of component 16 and the printed wiring board 10. This may be because the shrink wrap package is too thick or perhaps the materials used to form layers 22, 24 and 26 reduce the flexibility of the package. As noted, resin 38 is injected into enclosure 34 to fill the cavity or gap between the shrink wrap package and the component surfaces, presumably to reduce localized stresses and insure the integrity of the shielding provided by the package.

11. For at least these reasons, Applicants respectfully assert that Jones does not disclose that which is recited in claim 36. Accordingly, Applicants respectfully request that the Section 102 rejections based on Jones be reconsidered and withdrawn. Nor is there any suggestion in the art of record that would lead one of ordinary skill in the art at the time of the invention to modify the teachings of Jones to arrive at Applicants' claimed invention. Applicants, therefore, also assert that Jones taken alone or in combination with the other art of record, does not render obvious Applicants' claimed invention.

Rejections Under 35 U.S.C. §103(a)

12. The Examiner rejected claims 36-51 under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,218,610 to Suzuki (hereinafter "Suzuki") in view of U.S. Patent No. 5,703,761 to Heiss (hereinafter "Heiss"). Based on the above Amendments and the following Remarks, Applicants respectfully request that the Examiner reconsider and withdraw these rejections.

13. The Examiner asserts that Suzuki substantially teaches Applicants' claimed printed circuit board with a conformal EMI shield. The Examiner concedes, however, that Suzuki does not teach the use of a dielectric coating in combination with the claimed

conductive coating as recited in claim 36. The Examiner relies on Heiss for such a teaching, and takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Suzuki to include the dielectric coating of Heiss and that such a modification would results in Applicants' invention as recited in independent claim 36. The rationale provided by the Examiner is that one having ordinary skill in the art at the time the invention would be motivated to make the proposed combination "for the purpose of protecting the components." (*See*, Office Action, page 7, first full paragraph.)

14. Applicants respectfully traverse this rejection for at least the following reasons. First, the proposed combination of Suzuki and Heiss is improper. No reference has been cited in the Office Action in support of the assertion that it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the proposed modifications to Suzuki's shielding structure. Second, even if Suzuki were to be modified as proposed in the Office Action, the resulting system would not contain all of the elements of Applicants' claimed invention.

The Proposed Modification of Suzuki is Improper

15. Applicants agree that after their novel disclosure has been read, it would thereafter be apparent to one skilled in the relevant art to make the novel conformal EMI shield of the present invention. What the Examiner has not explained, however, is why anyone of ordinary skill, without having had the benefit of Applicants' novel teachings before them, would have been motivated to make the novel combination of elements required to create the conformal EMI shield of the present invention. Certainly, neither Suzuki, Heiss nor the art as a whole contains any teaching or suggestion to modify the teachings of Suzuki to include the dielectric coating of Heiss as asserted by the Examiner.

16. Suzuki is directed to a structure for shielding an electronic circuit from radio waves. (*See*, col. 2, lns. 6-10.) The structure is a rigid plastic case 300 (Fig. 2B) which is open on one side 310 with an interior surface 320 that is stepped to form a surface for receiving a printed circuit board 200. Once received, the printed circuit board 200 closes the open side 310 of the shield case 300. (*See*, col. 4, lns. 28-39.) The inner surface of the shield case 300 is formed of a conductive layer 330. The circuit board includes an inner layer 210 of metal foil which provides shielding properties. (*See*, col. 4, lns. 42-45.)

A radio frequency circuit block 220 is located on a lower surface of printed circuit board 200 with antennas 221, 222 formed on the upper surface. When installed in shield case 300, the radio frequency circuit block 220 is shielded on five sides by the shield case 300 and on the sixth by conductive inner layer 210. (See, col. 4, lns. 41-61; col. 5, lns. 33-38.) As shown in Figure 5 there is a large, shielded cavity in which the component 220 is disposed.

17. Contrary to the assertions made in the Office Action, conformal coating 330 is not applied to printed circuit board 200. Rather, it is formed into or applied to the inner surface of shield case 300. This is best illustrated in Figure 5 which clearly illustrates the shielded space defined in part by conductive coating 330 on the inner surfaces of shielded case 300, conductive layer 210 of printed circuit board 200, and other components. (See, col. 5, lns. 49-58; Fig. 5.) Thus, Applicants respectfully assert that Suzuki neither teaches nor suggests a conformal coating that conformally coats a printed circuit board and which comprises a conductive coating conformingly adhered to surfaces of the printed circuit board as recited in independent claim 36.

18. Heiss does not disclose that which is missing from Suzuki. Heiss is directed to a shield for flat modules. A deep-drawn plastic film 5 laminated on its exterior side with a metal film 4 is in the form of a clam shell adapted to receive a printed circuit board 2. As with Suzuki, the conductive coating does not conformingly adhere to the surfaces of printed circuit board 2 and components 1. In the case of Heiss, the conformal coating 4 is applied to the exterior of the casing 5. As in the Suzuki arrangement, there is a space or cavity formed by the shield case 5 in which the circuit board 2 resides. (See, col. 1, ln. 26 – col. 2, ln. 53.) In the embodiment illustrated in Figure 2, a non-conductive material 7 fills this cavity. Thus, as shown in Figure 2, the non-conductive layer 7 does not conform to the surfaces of the coated printed circuit board regions as recited in claim 36.

19. In order to show that one of ordinary skill in the art would be motivated to combine references, an "Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." See *In re Rouffet* 47 U.S.P.Q.2nd 1453, 1458 (Fed. Cir. 1998). "Evidence of a suggestion, teaching, or motivation to combine... must be clear and particular." *In re Dembiczik*, 50 U.S.P.Q.2nd 1614, 1617 (Fed. Cir. 1999) (citations

omitted). "Broad conclusory statements regarding the teaching of multiple references, standing alone, are not 'evidence.'" *Id.* The Examiner has simply not met this burden in the Office Action.

20. The motivation relied upon by the Examiner is, as noted, that it would "protect the components." However, there is no mention in the references that there is a need to protect the components. Even if there was such a need mentioned in the prior art, the Examiner has failed to show how that need to provide protection would cause one of ordinary skill in the art to modify Suzuki to include the non-conductive material 7 of Heiss. For example, Heiss does not mention any explanation for the use of non-conductive layer 7. Thus, the only conclusion that can be drawn, based on the record of this application, is that the suggestion forming the basis for the Examiner's otherwise factually unsupported conclusion must have come from Applicants' own novel disclosure; that is, it is based on impermissible hindsight. It is too well settled for citation that Applicants' own novel disclosure cannot be used to supply the teaching or suggestion that is missing from the known art.

21. Accordingly, Applicants respectfully assert that no legitimate rationale for modifying Suzuki, let alone that it be modified as suggested by the Examiner, has been set forth by the Examiner. For these reasons alone, Applicants respectfully request that the rejection under Section 103 of independent claim 36 be reconsidered, and that it be withdrawn.

Even if Suzuki Were Combined with Heiss as Proposed, the Resulting System Would not Contain all of the Features of Applicants' Claimed Invention

22. Further, even if Suzuki were to be combined with Heiss as suggested in the Office Action, the resulting system would still not result in, neither would it have the advantages of, the present invention without substantial modifications being made to the resulting system. Specifically, in contrast to Suzuki, Heiss or the proposed modification thereof, independent claim 36, as amended, recites:

36. A printed circuit board comprising:
a printed wiring board;
a plurality of components mounted on said printed wiring board; and
an electrically continuous conformal coating for ***conformingly adhering to surfaces of one or more regions of the printed circuit board*** to which the conformal coating is applied, comprising,
a conductive coating that prevents the electromagnetic waves from passing therethrough, said conductive coating ***conformingly adhered to the surface of the one or more regions of the printed circuit board***, and
a dielectric coating interposed between said conductive coating and predetermined portions of each of the one or more printed circuit board regions, wherein said ***dielectric coating is conformingly adhered to and insulates said predetermined portions of said printed circuit board region.***

(See, amended claim 36, above.)

23. The combination of elements recited in claim 36 are no where taught or suggested by Suzuki, Heiss or other art of record. Thus, the modified version of Suzuki, even if it were suggested by other than hindsight, would not meet the teachings of Applicants' invention as recited in amended independent claim 36. Specifically, there is no teaching or suggestion in Suzuki to provide a conformal EMI shield with a conductive coating that conformingly adheres to the printed circuit board surfaces. As noted, Suzuki is directed only to a rigid shielded cage with an interior surface coated with a conductive coating. That surface is spaced away from the printed circuit board to form part of the noted shielded enclosure. The only shielding capability provided by the printed circuit board 200 is the internal layer in the printed wiring board. There is no conductive coating that conformingly adheres to the surfaces of the printed circuit board as recited in claim 36. Furthermore, as acknowledged in the Office Action, there is no mention of dielectric coatings in Suzuki. Thus, Suzuki fails to disclose both recited elements of the claimed electrically continuous conformal coating.

24. The Heiss shield also includes a conductive coating which also does not conformingly adhere to surfaces of the printed circuit board. The Heiss conductive

coating is applied to the exterior surface of the plastic shield 5 which forms a cavity in which the printed circuit board is located. Thus, the Heiss conductive layer does not conform with nor does it adhere to the surface of the printed circuit board. In addition, the dielectric coating of Heiss serves as a filler material that fills the cavity between the shield and printed circuit board. There is no teaching or suggestion that the dielectric coating does conform to surfaces of the printed circuit board, as recited in amended independent claim 36.

25. Thus, Applicants respectfully assert that Suzuki taken alone or in combination with Heiss neither teaches nor suggests the features of Applicants' invention as recited in independent claim 36. For this reason alone, Applicants respectfully assert that the Section 103 rejection of independent claim 36 is improper. Accordingly, Applicants respectfully request that the rejection of independent claim 36 be reconsidered and withdrawn.

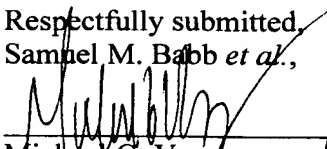
Dependent Claims

26. Dependent claims 38, 39, 41, 42, 44, 46-48, 50 and 53-71 incorporate all of the subject matter of independent claim 36 and add additional subject matter which makes them a fortiori and independently patentable over the art of record. Accordingly, Applicants respectfully request that the rejections of the dependent claims be reconsidered and withdrawn.

CONCLUSIONS

27. In view of the foregoing Amendments, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after entering this paper into the record, that an interview will facilitate prosecution of this application, the Examiner is requested to call the Applicants' representative at the number provided below.

Respectfully submitted,
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Dated: June 20, 2002

***MARKED UP VERSION OF CLAIMS
SHOWING ALL CHANGES MADE***

**[ATTACHMENT TO THE AMENDMENT AND RESPONSE FILED IN RESPONSE
TO THE OFFICE ACTION DATED MARCH 28, 2002
IN U.S. PATENT APPLICATION 09/812,274.]**

36. (Twice Amended) A printed circuit board comprising:

a printed wiring board;

a plurality of components mounted on said printed wiring board; and

an electrically continuous conformal coating for [providing an EMI-impervious shield] conformingly [coating] adhering to surfaces of one or more regions of the printed circuit board to which the conformal coating is applied, comprising, [including,]

a conductive coating that prevents the electromagnetic waves from passing therethrough, said conductive coating conformingly adhered to the surface of the one or more regions of the printed circuit board, [wherein said conductive coating of each said region is electrically connected to each other,] and

a dielectric coating interposed between said conductive coating and predetermined portions of each of the one or more [said] printed circuit board regions, [region,] wherein said dielectric coating is conformingly adhered to and [completely] insulates said predetermined portions of said printed circuit board region.

50. (Twice Amended) The printed circuit board of claim 36, wherein one or more components are coated individually with said conformal coating, [EMI shield,] wherein said conformal coating [EMI shield] which coats the one or more components is electrically connected to said conformal coating on said printed circuit board.



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re U.S. Patent Application PD No. 10992052-1

Atty: LJG S/N: 09/812,274 File Date: 03/05/02

Inventor: BABB ET AL

Title: A BOARD LEVEL ENI SHAPE THAT ADHERES TO
AND CONFORMS WITH PRINTED CIRCUIT BOARD ...

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